

In the chapter on blood and lymph a fuller account of leucocytes with their varieties and functions, and especially of the proteid and other substances associated with them, would certainly have been desirable. It is of course easy, in reviewing so small a book, to find instances of curtailment and of omission, but the life history of the leucocytes is of supreme importance medically, that even the account of the derivatives of hæmoglobin might, for their sake, have been shortened.

The phenomena of muscular contraction are well described, and the account of muscle and nerve currents is especially clear and to the point.

In the chapter on the vascular mechanism two tracings of pressure in an artificial schema are taken from Prof. Foster's text-book. The tracings are accurately reproduced. In the description of these we are told that, after a high peripheral resistance is introduced into the circuit, "the pressure on the arterial side at first rises with every beat till it has attained a certain height, where it remains stationary, merely oscillating with every stroke of the pump. The venous manometer, on the other hand, shows no rise of pressure, and its oscillations becomes less and less, till they disappear and the flow becomes continuous." A glance at the tracing shows, however, that there is a rise of pressure on the venous side, and moreover a maintained rise. This is a very important point about the tracing. A student grasps readily the action of the arterial blood pressure in forcing the blood from the aorta to the capillaries, but he is at a loss to understand why it comes back again from the capillaries towards the heart. It cannot be too much insisted on that we have a pressure, a small and gradually falling pressure, in the veins, and that this is the important determining cause of the venous flow. The author, in this the proper place to bring this prominently forward, leaves it out entirely, though it is incidentally referred to later on, and leads the student to suppose that the presence of the valves in the veins and the aspiration of the thoracic movements, important though they may be, are the chief factors.

The subject of endocardial pressure and of the pulse is treated, clearly and concisely, in the light of Hürthle's important work. This is particularly welcome, as, if I am not mistaken, this is the first occasion that these researches have been brought before English readers.

In the discussion of the causation of the heart's beat it does not seem clear why "the beat always starts in the sinus" when we are told that the sinus contracts feebly and slowly. The fact that the sinus has a more rapid rhythm than the other chambers of the heart, and so initiates the whole cycle, is not distinctly brought out. The author follows Schmiedeberg's opinion in stating that muscarin acts by stimulating the nerve-endings of the vagus. This is by no means certain, and we should have welcomed some mention of Gaskell's opinion that its action is a direct one on the muscular tissue, and some of the reasons for taking that view. In the description of the vasomotor mechanisms I have found no adequate statement of the important part vaso-dilator nerves play in regulating the circulation in skeletal muscle.

In the account of the nervous mechanism of respiration, which is well up to date, in including some of the results of the work of Head, we should have expected also some statements of Marckwald's observations on the influence

of section of the medulla above the respiratory centre. No reference seems to be made of the influence of impulses reaching the respiratory from higher centres of the brain. It is also unfortunate that when the student turns, as directed, to Fig. 61 he finds that the tracing selected of the effect on the respiration of section of the vagi does not show the increase in amplitude as it does the decrease in rate, although he is told that both the changes are brought about. On page 266 there is an obvious misprint; the word "expiratory" should be "respiratory." On page 291 there is another misprint, " B_2 " in the equation should be, of course, "Br." A few lines further on there is, however, a serious error. We read, "From the amount of nitrogen given off the amount of urea present in the urine, may be calculated. 35.5 c.c. of nitrogen correspond to one gram of urea." The theoretical amount calculated for one gramme of urea is 37.7 c.c. at standard temperature and pressure, while 35.5, or more exactly 35.4 c.c., is the amount which Hüfner found was actually liberated not by one gramme, but by one decigramme of urea.

The chapters on the special senses and on the central nervous system are some of the best in the book. The methods of tracing fibres in the cord and brain are fully gone into, so also is localization of function, and indeed the account of the brain throughout is very clear and good.

At the end of the book is a short appendix, in which is given a description of apparatus purely physical in nature. Every teacher will agree with the author that it is not only desirable, but necessary, to put this in a manual of physiology. The ignorance of the construction and use of the simplest physical apparatus, which the average medical student carries with him into the physiological laboratory, is usually almost as perfect as it can be. Much of the time of a demonstrator of physiology has at first to be given to the teaching of some of the simplest physical methods.

L. E. S.

APPLIED MECHANICS.

Elementary Manual on Applied Mechanics. By Prof. Jamieson. (London: C. Griffin and Co., Limited, 1892.)

THIS is the latest addition to the series of books introduced by Prof. Jamieson during the last few years. Like his useful work on the Steam Engine, it is the outcome of the course of lectures which he delivers to his own students. It is replete with the many mechanical contrivances to be found in the workshop, one chapter being devoted to the consideration of the screw-cutting lathe alone.

The illustrations, with which the book abounds, and the necessary descriptions of the various machines considered, are all that one may wish for.

An excellent feature of the book will be found in the manner in which, after having enunciated a principle, the author has applied it to some well-chosen examples. In this direction he has proceeded to an extent which will be highly appreciated by the student. Further, he has availed himself of any opportunity to obtain results experimentally, and these form a very instructive series of examples for the young engineer.

A careful perusal will show that the author considers it desirable that all matters pertaining to units, definitions, symbols, &c., should be carefully attended to. But in his treatment of these he has not been entirely successful.

Take, for instance, his definition of the moment of a force on p. 15:—"The moment of a force is equal to the force multiplied by the perpendicular distance from a point on its line of action." This is rather ambiguous, and we should prefer to see the words, *with respect to a point*, included in the definition.

In a footnote, p. 214, objection is taken to f being used for acceleration, since it "naturally represents a force."

Then why use e for strain in the formula $e = \frac{l}{L}$, where e just as naturally represents an elongation, and strain is not an elongation, as the author clearly shows in another footnote on p. 232?

Again, in a footnote on p. 2 we have: " $M = \frac{W}{g}$, where M stands for the mass, W for the weight in pounds, and g for the acceleration of gravity."

Now on p. 215 the reader is asked to accept as correct the formula for centrifugal force, $P = \frac{Wv^2}{gr}$ lbs., but (continues the author) since $M = \frac{W}{g}$, then $P = \frac{Mv^2}{r}$ poundals. Why should this substitution produce the change from pounds to poundals? We fail to see what is gained by having an ellipse for the figure representing motion in a circle.

There is a want of consistency when an acceleration is spoken of as " a feet per sec. in one second" in one place, and as " a feet per sec." on p. 219. On the same page, too, $\frac{Wv^2}{2a}$ should evidently be read as $\frac{Wv^2}{2g}$.

The examples worked out in the chapter on bending moments will show the student how to apply the principle of moments to the case of a beam loaded in any given manner. This is preferable to merely using a set of formula, a system attended with most disastrous results.

At the end of each chapter will be found a good selection of examples on the matter considered therein. We are informed that another volume dealing with the more advanced portions of the subject is in the course of preparation.

G. A. B.

OUR BOOK SHELF.

Man and the Glacial Period. By G. Frederick Wright, D.D., LL.D., F.G.S.A. (London: Kegan Paul, Trench, Trübner and Co., 1892.)

THE title of this book raises expectations which the contents fail to satisfy. Out of 374 pages only sixty are devoted to the consideration of "the relics of man in the Glacial Period," and the treatment of the subject is, to say the least, uncritical. The reader does not learn from Prof. Wright that strong doubt has been expressed as to whether some of the "finds" of human relics in North America were really made in undisturbed glacial deposits, while his discussion of the European evidence is crude

and inadequate, not to say misleading. The author has apparently only a slight acquaintance with the literature of the subject, acquired chiefly from such recondite sources as Lyell's "Antiquity of Man," and treatises on general geology. Of the many interesting facts bearing on man's relation to the Ice Age which have been discovered since those works were published our author is apparently ignorant. Nor has "a summer spent in Europe" sufficed, as who could expect that it should, to make up for his other deficiencies. Fortunately, the major portion of his volume deals with the glacial phenomena of North America, for here he is on safer ground. We feel sure, however, that many of his statements and conclusions will receive scant support from geologists across the water. It would be interesting to know, for example, what evidence can be adduced to show that the southern part of the United States was submerged during the Glacial Period to the extent of 500 feet, so as to bring the waters of the Gulf of Mexico into Illinois and Indiana. Again, we were under the impression that the author's "Ohio Lake," which he supposes came into existence when the great ice-sheet advanced into that region, had been effectually disposed of by Mr. Leverett and Prof. Chamberlin. Throughout the book the unity of the glacial period is confidently upheld, a view which Prof. Wright is, of course, entitled to maintain; but he might have informed his readers that with few exceptions American geologists are quite of another opinion. He fails to understand the evidence adduced by Chamberlin and others in favour of the periodicity of glaciation, while so far as one can gather from his pages, he seems to know nothing of the facts bearing on this question which geologists in Europe have accumulated, especially during the past few years.

Altogether we much prefer the author's earlier work, "The Ice Age in North America," of which the present is more or less of an abstract. In the former the facts of American glacial geology were given in considerable detail, and the writer's crude speculations and hypotheses were less obtrusive. Should the present work come to a second edition we would advise Dr. Wright to get some scientific friend to assist him in its revision. Loose unscientific phraseology and incorrect definitions are of not infrequent occurrence throughout the volume. Thus we read of "glacial ice," of "beautiful crystals of porphyry," &c., and are told that névé is the "motionless part" of a glacier, although a little further on we learn that it is from this "motionless" névé that "the glacier gets both its supply of ice and the impulse which gives it its first motion." Obviously Dr. Wright is unacquainted with the observations of MM. Pfaff, Kloehe, and Koch on the movement of névé, while he might increase his knowledge of glacier motion by studying what Messrs. McConnell and Kidd have to say upon that interesting subject.

Beetles, Butterflies, Moths, and other Insects. By A. W. Kapple and W. Egmont Kirby. (London: Cassell and Co., 1892.)

THIS work is a slight sketch of the more prominent British insects, intended for youthful and very inexperienced entomologists. The first section is devoted to classification, the key to the orders of insects being a fairly workable one, though it takes no account of the very numerous exceptions. Then follows a section on structure, in which when describing the eye the authors ignore the latest experiments on the subject, proving that the compound eyes form but a single image of the object seen; they also treat the tongue or proboscis as if it were homologous throughout the orders, whilst in lepidoptera it is developed from entirely different organs from what it is in the others, except in the very lowest family; and again when describing the legs they fall into the almost incredible error of speaking of the first joint as the trochanter, saying it is joined to the thorax by a hinge-